REMARKS

A new drawing of FIG. 2 has been added, per the attached, to overcome a few noted informalities contained within the specification and noted by the Examiner. The accompanying new formal drawing incorporate all of the requested drawing amendments. If any further amendment to the drawings is believed necessary, the Examiner is invited to contact the undersigned representative of the Applicant to discuss the same.

The above amended paragraphs of the specification overcome some informalities noted in the specification on file. The undersigned avers that the amended paragraphs of the specification do not contain any new subject matter.

Claims 12 and 13 are rejected under 35 U.S.C. § 112, first paragraph, for the reasons noted in the official action. The inadequate written description rejection is acknowledged and respectfully traversed in view of the following remarks.

Claim 15 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for the reasons noted in the official action. The rejected claims are accordingly rewritten as new claims, and the presently pending claims are now believed to particularly point out and distinctly claim the subject matter regarded as the invention, thereby overcoming all of the raised § 112, second paragraph, rejections.

Claims 12-14 and 23 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Applicant's admitted prior art ("admitted art") in view of Fonkalsrud et al. '549 (U.S. Patent No. 6,560,549) and Rieger et al. '708 (U.S. Patent No. 7,025,708). The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

The work machine and control function of the admitted art, as discussed in paragraph 7 of the Applicants specification, includes a drive motor which drives power consuming devices and also drives the wheels of the vehicle via both a hydrodynamic torque converter and a

clutch. There are a number of distinctions between the claims of the application and the background of the invention as discussed in the specification.

First, the arrangement of the elements of the admitted art, as discussed in paragraph [007], should be noted. This paragraph states that the work machine has a drive motor which drives the vehicle wheels via a hydrodynamic torque converter and a clutch device. There is no discussion of the specific arrangement of these elements in relation to each other. In contrast, the claims of the application include the limitations that the motor is connected to the hydrodynamic torque converter which is connected to the clutch which in turn is connected to the wheels of the vehicle. The arrangement of the motor, the torque converter and the clutch is vital in that to determine the torque as claimed it is important to have the clutch between the torque converter and the downstream transmission or wheels. In this manner, it is possible to drive the power consuming device (hydraulic pump) without the need of a clutch between it and the motor. Furthermore, if the clutch were between the motor and the torque converter, it would not be possible to determine the torque in the manner claimed because if the clutch was at least partially disengaged the rotation speed of the impeller of the torque converter would decrease.

Next, the admitted art in paragraph [007] of the background of the invention as cited by the Examiner function in a manner that is distinct from the claims of the application. As stated in the reference, "the driving clutch is opened upon actuation of the service brake", that is in other words, the clutch is disengaged no matter the level of actuation of the service brake. This manner of disengaging the clutch presents the problems discussed later in the specification. Namely, if the vehicle is driving up the ramp with a load and the brake is only lightly actuated or only partially engaged, the clutch would disengage such that no drive was being passed to the drive wheels and the brakes being only lightly or partially engaged would allow the vehicle to roll backwards down the ramp.

In contrast to the admitted art the claims of the application, the manner and timing of disengagement of the clutch is dependent on a number of factors. As claimed, when disengaging the clutch, the amount of torque input to the clutch as well as the braking force being applied to the braking system are both considered. The torque input into the clutch is dependent upon the rotational speed of the hydraulic pump, which is being independently driven by the drive motor, the rotational speed of the turbine of the hydrodynamic torque converter and the characteristic rotational speed line of the hydrodynamic torque converter. Each of these are factors in determining the input speed of the clutch. As discussed above and claimed, disengagement of the clutch is directly dependent on the clutch input torque and the braking force being applied to the braking system of the vehicle. In this manner, if there is a great deal of torque being applied to the clutch, such as when the vehicle is traveling up a ramp with a load, the clutch will not disengage until a great amount of force is applied to the braking system. This prevents the vehicle from rolling backwards down the ramp.

Fonkalsrud et al. `549 relates to a method for determining the transmission output torque of an earth moving machine. It should be noted that Fonkalsrud et al. `549 teaches an arrangement of drive train elements in Fig. 1. In this figure, the engine 105 is first connected to a clutch 116 which is connected to the torque converter 106, specifically to the impeller 108 of the torque converter 106. The torque converter 106 is connected downstream to the transmission 114. The clutch 116 is therefore arranged between the motor 105 and the torque converter 106, not between the torque converter and the downstream drive wheels as currently claimed.

In further contrast to the claims of the application, the method of Fonkalsrud et al. `549 includes a step of determining the output torque of a torque converter which the Examiner equates with the input speed of the clutch as claimed. Although the output torque of the torque converter may arguably relate to the input torque of the clutch, even if the clutch was located

downstream from the torque converter (in Fonkalsrud et al. `549 the clutch is upstream from the torque converter), the manner in which Fonkalsrud et al. `549 determines the output torque of the torque converter is distinctly different than the claims of the application.

The converter output torque is determined, as taught by Fonkalsrud et al. `549, with an equation that depends on each of "the primary torque, the torque ratio, and the input and output speed of the torque converter 113." Each of these four variable needs to be calculated before determining the output torque of the torque converter. First, "the input speed of the of the converter 106 is equal to the engine speed" when the impeller clutch is not slipping (col 3, lns. 60-62). Next, "the output speed of the converter 106 is determined by analyzing the torque converter output speed signal" (col. 4, 24-27). Then, "the primary torque is determined using a look-up table" (col. 4, ln. 41) and finally the "torque ratio is dependent upon the converter speed ratio, and is determined using a lookup table" (col. 4, lns. 60-62). The step of determining the output torque of the converter includes numerous additional steps thus making the process of Fonkalsrud et al. `549 much more complicated and extensive than the steps of the claimed method.

In distinction from the teachings of Fonkalsrud et al. `549, the claims of the application include the step of determining the input torque of the clutch which includes considering the rotational speed of the hydraulic pump, the rotational speed of the turbine of the toque converter and the characteristic rotational speed line of the hydrodynamic torque converter. Fonkalsrud et al. `549 specifically fails to teach giving consideration to the rotational speed of a hydraulic pump (power-consuming device)

Rieger et al. `708 relates to a method of changing the clutch torque in the power train of a vehicle while driving in creep mode. The Applicant respectfully asserts that Rieger et al. `708 is distinct from the claims of the application.

It is noted that the method disclosed by Rieger et al. `708 is used in a vehicle which is traveling in a creep mode. As stated, "one or more operating parameters of the vehicle are monitored which describe a slow drive mode or creep drive mode of the vehicle and, as a function of the operating parameter(s), the torque transmitted by the clutch is changed." (col. 2, lns. 17-21). The Applicant asserts, that the operating parameters used in this reference are only used when they describe a slow drive mode or a creep mode.

Rieger et al. `708 teaches that the clutch is controlled taking into account one or more of the following parameters: the strength of brake actuation which influences the speed of the vehicle; variables of the drive motor, such as the rotational speed and the engine torque; the difference in rotational speeds between the input and the output of the clutch; and an accelerator pedal value can all be considered when controlling the clutch. Although Rieger et al. `708 teaches using a number of parameters when controlling the function of a clutch, the reference fails to teach a number of the factors claimed in the application and fails to teach the manner in which these factors are considered when controlling the function of a clutch. As such the Applicant contends that the claims of the application are distinct from the teachings Rieger et al. `708.

In order to emphasize the above noted distinctions between the presently claimed invention and the applied art, independent claim 33 of this application now recites the features of "determining an input torque of the clutch with an electronic controller upon reception of the braking signal by the electronic controller, the input torque of the clutch being dependant upon a rotational speed of the hydraulic pump, a rotational speed of a turbine of the hydrodynamic torque converter and a characteristic rotational speed line of the hydrodynamic torque converter . . . associating a predetermined braking signal with the determined input torque of the clutch; comparing the value of the braking signal with a value of the predetermined braking signal; and only disengaging the clutch when the value of the braking signal matches the value of the

predetermined braking signal." Such features are believed to clearly and patentably distinguish the presently claimed invention from all of the art of record, including the applied art.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejections should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejections or applicability of the Applicant's admitted prior art, Fonkalrud et al. '549 and/or Rieger et al. '708 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,

Jay S. Franklin, Reg. No. 54,105
Customer No. 020210
Davis & Bujold, P.L.L.C.
112 Pleasant Street
Concord, NH 03301-2931
Telephone 603-226-7490
Facsimile 603-226-7499
E-mail: patent@davisandbujold.com